



TOASTER WITH COOLED HOUSING

CROSS REFERENCE TO RELATED APPLICATIONS

This application is the US national phase of PCT application PCT/EP03/01559, filed 17 February 2003, published 11 December 2003 as WO 03/101267, and claiming the priority of Italian patent application MI2002A001188 itself filed 31 May 2002.

FIELD OF THE INVENTION

The present invention refers to a toaster.

BACKGROUND OF THE INVENTION

As is known, for reasons of cleaning, strength and aesthetics, some of the current toasters are made from metal, generally chromed housing, inside of which there are a plurality of quartz radiating elements or wire resistances, which are normally operated by a control device activated by the user of the toaster.

The radiating elements are arranged near to the toast-cooking chamber the access to which is defined by two load openings on the top of the metal outer housing.

The metal side walls on the outside of the toaster, when it is on, heat up substantially by radiation, reaching high temperatures with the first toasting operation of greater than 60°C.

The upper metal parts of the housing with the two load openings also heat up by radiation and convection of the hot air passing out of them. At the end of the first toasting operation, these upper parts of the housing reach very high temperatures,

greater than 150°C in the central zone, with the risk of causing burns to the user who accidentally places a hand in direct contact with such parts.

In toasters of the known type, in a first embodiment, the heat by radiation is generated by the radiating elements with wire resistances mounted on thin mica panels and having a power density which increases from top to bottom, i.e. toward the inside of the toaster, since the high parts of toast are heated by heat coming from below.

In the same way, in a second embodiment heat is generated by quartz radiating elements associated with reflective parabolas directed so that the infrared radiation better reaches the lower layers of the toast.

The control device of toasters of the known type is normally cooled by means of the "chimney effect" caused by the flow of hot air from bottom to top, bringing in fresh air from the base of the domestic appliance.

As a consequence, it should be noted that toasters with a metal housing have, among other drawbacks, that of having the surfaces hot to such a point as to be able to burn the user both during use and immediately afterward.

Moreover, all of the heat combines to heat the upper part of the apparatus.

OBJECT OF THE INVENTION

The task proposed of the present invention is eliminating the aforementioned drawbacks of known toasters with a metal housing.

SUMMARY OF THE INVENTION

In this task, an important object of the invention is to provide a toaster, which, while still having a power which is equal to or less than that of a toaster of the known type, keeps its outer metal walls at an extremely low temperature or at least a temperature lower than that which could burn the user.

Yet another object of the invention is to provide an apparatus for cooking toast which also allows the optimal cooking of filled sandwiches (or of individual slices of toasted bread) which need higher temperatures for cooking ham and melting cheese contained in the toast since all of the heat goes to heat the upper part of the apparatus.

A further object of the invention is to provide an apparatus for cooking toast which can use the heat generated for secondary uses, such as heating food outside the toaster.

The last but not least object of the invention is that of providing an apparatus for cooking toast which has an extremely robust metal body, which is easy to clean and which does not have hot air coming out its top, but rather from a side .

SUMMARY OF THE INVENTION

These objects are achieved by an apparatus for cooking toast having a body with an outer metal housing inside which there

is a plurality of heat-radiating elements operated by a control device and arranged near the cooking chamber access to which is defined by one or more load openings in the outer housing . The toaster comprises means for cooling the surfaces of the outer housing.

Further characteristics and advantages of the invention shall become clearer from the description of a preferred, but not exclusive; embodiment of the apparatus for cooking toast according to the invention, illustrated by way of example and not limiting purposes in the attached drawings, in which:

FIG. 1 is a cross-section side view of the apparatus for cooking toast according to the invention; and

FIG. 2 is a partial schematic view of one of the radiating elements according to the invention showing that they are thicker at the top and thinner at the bottom.

SPECIFIC DESCRIPTION

With reference to the drawing, the apparatus for cooking toast, or toaster, according to the invention, wholly indicated with reference numeral 1, comprises a body with an outer metal housing 2, inside of which there is a plurality of radiating elements, for example quartz radiating elements or wire resistances 3.

The radiating elements 3 are operated by an unillustrated control device at the bottom of the housing 2 inside a plastic base 4. The radiating elements 3 flank a cooking chamber 10 for the

toast, access to which is defined by two load openings 7 on the top of the housing 2.

Advantageously, the toaster 1 has cooling means 5, for the surfaces of the outer housing 2. In particular, the cooling means 5 comprises a ventilation member, more precisely a radial fan 6, housed in the base 4 and capable of generating a current of air which is sucked in through the upper load openings 7 and is expelled at the side and at the bottom of the body, and in particular from the base 4 through discharge openings 18.

More specifically, the current of air has a first stream 8 of cold air which is sucked in through the load opening 7 and a second stream 9 of hot air that is drawn from the cooking chamber 10. The first stream 8 of cold air passes mainly in perimetric passages 11 formed by partitions inside the housing 2, whereas the second stream 9 of hot air is pulled mainly from the cooking chamber 10 and mixes with the first stream 8 of cold air at the bottom of the housing 2, upstream of the radial fan 6.

The unillustrated control device preferably is housed inside the base 4. Therefore, it is constantly cooled by the first stream 8 of cold air.

Suitably, the first and second streams 8 and 9 are substantially kept separate from each other at least along the whole length of the housing 2, so that the sides, front and upper wall surfaces 31 have a low temperature and thus do not feel hot to the user when he touches them.

The wire radiating elements 3 suitably have a power density which decreases toward the base of the housing 2 and increases toward the load opening 7. This is due to the fact that the flow of air, as stated, enters from the upper load opening 7 and leaves from the lower discharge opening 18. Therefore, inside the cooking chamber 10 hot air will move downward, compensating for the lower density of the radiating elements 3 in this zone, so as to give the food product or the toast inside the cooking chamber 10 a virtually uniform radiation on all of its surfaces.

The toaster 1 also has closing or shielding elements for the load opening 7 in order to improve performance, i.e. regulate the flow of fresh air 8 along the walls, and to avoid the passage of radiation emitted by the radiating elements 3 through it. For example, the shielding element can be made in any way and, in the embodiment shown in the attached figures, the shielding element comprises a simple door 19 which can be opened for the introduction or removal of toast and which is closed during cooking or when the toaster is not being used so as to avoid the escape of radiation thus keeping the upper surfaces 31 even cooler during operation, and to avoid the entry of dust or dirt inside the cooking chamber 10 when the toaster 1 is not in use.

Clearly, in place of the door 19 any other system can be used, for example commanded by the same lever which allows the toast to drop into the cooking chamber 10.

In other embodiments (not represented) the toaster does not have the shielding elements.

The speed of the radial fan 6 can advantageously be varied according to the temperature reached inside the cooking chamber 10. This allows there to be a further regulation of the temperature in the cooking chamber 10 which, thanks also to the presence of the door 19, can operate as a veritable small oven reaching high temperatures while still keeping the surfaces 31 outside of the metal housing 2 cool.

Moreover, delivery through the discharge opening 18 of a stream of warm air can allow the heating of croissants or other foods, or butter, placed on top of a side support 21 which can fold onto the side of the body of the toaster 1.

The flow of air from the housing 2 and inside the base 4 is regulated by openings 22 formed in a crumb collection tray 23 placed centrally at the bottom of the cooking chamber 10.

Moreover, it should also be noted how the base 4 has walls 24 made from plastic which cover the walls 31 of the housing 2 in a lower region where it gets hottest due to the mixing of the two air streams 8 and 9, thus guaranteeing the total cooling of the side walls of the metal housing 2.

The operation of the apparatus for cooking toast according to the invention can clearly be seen from that which has been described and illustrated.

In particular, each time one wishes to make toast the control device makes the fan 6 rotate to create a flow of air moving downward and thereby cooling the outer wall surfaces 31 of the metal housing 2 and subsequently exiting the housing 2 in a

predetermined direction, for example toward the support 21 which can thus be heated.

In practice, it has been noted how the apparatus according to the invention is particularly advantageous for having its outer walls cool, while still being made from metal, and for allowing the hot air used to cool down these walls to be reused.

The invention thus conceived is susceptible to numerous modifications and variants all covered by the inventive concept. Moreover, all of the details can be replaced with technically equivalent elements. In practice, the materials used, as well as the sizes, can be varied according to requirements and the state of the art.